UNIVERSITY of SAN CARLOS

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Compilation of Activities in MECE 617: ROBOTICS

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ABSTRACT

This document is a compilation of all the activities tasked to the student as requirement for the course MECE 617.

As an introduction to Robotics, the student was given an assignment to work on the solutions of the following: Forward and inverse kinematics of two – link planar manipulator through Trigonometric approach and Denavit – Hartenberg convention, and the forward kinematics of Programmable Universal Manipulation Arm (PUMA) Robot and Stanford manipulator with Denavit – Hartenberg convention.

From the student's understanding, forward kinematics is the use of necessary equations derived from the given joint parameters to determine the manipulator's end – effecter, on the contrary, inverse kinematics is the reverse process of finding out the joint parameters with the available end – effecter's position.

Forward and inverse kinematics solution through trigonometric approach can be solved if you can obtain the mathematical equations necessary using trigonometric identities and utilizing the available data, whether the joint parameters (for forward) or the end – effecter's position (for inverse kinematics).

On the other hand, what the student believe to be an important requirement for us to solve the forward kinematics of any manipulator through Denavit – Hartenberg convention is for us to be able to determine the Denavit – Hartenberg parameters of a particular manipulator, to guide the student in defining the parameters for a particular manipulator, the student refers to a book entitled "ROBOTICS: Control, Sensing, Vision, and Intelligence" by Fu, Gonzales, and Lee. Once the Denavit – Hartenberg parameters have already been established, solving for the end – effecters position and orientation is already viable, you just have to do the necessary operations that mainly involves multiplication of matrices.

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